UNITED STATES PATENT APPLICATION
Non-Linear Adaptive AM/AM and AM/PM Pre-Distortion Compensation
With Time and Temperature Compensation for Low Power Applications

ABSTRACT

This invention provides a technique and an architecture to pre-distort signals such that when the signals are amplified, the non-linear distortions of the amplifier chain are opposite that of the pre-distortion thus yielding a distortion free or nearly distortion free signal at the output of the amplifier chain. This invention provides for a low power application by using a LUT predistortion that is performed on a composite real signal (I and Q combined) such that the size of the LUTs required is reduced to a very small size. In this invention, the I and Q input signals are digitally modulation with quadrature digital sinusoidal signals and then combined to create the real composite signal at a digital IF. The real signal is then pre-distorted to compensate for AM/AM distortion first and then for AM/PM distortion. The pre-distorted signal is then digitally decomposed back in to I and Q samples for conversion to analog and up conversion to RF. The non-pre-distorted real signal is sampled and compared with a sample of the post amplified signal and the non-linear update algorithm is updated to compensate for the variation of non-linear distortion as a function of time and temperature. The architecture and techniques described herein provide for a low power and low memory implementation that can be used in mobile applications such as cell phones and Personal Data Devices (PDAs)